



THE EFFECTIVENESS OF MIRROR THERAPY AMONG STROKE PATIENT

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ABSTRACT

This review gives a direction that mirror therapy is effective for hand function. Mirror therapy (MT) is an alternative therapeutic intervention that enhances movement performance of the impaired hand of stroke patient. It has been suggested that mirror therapy is a simple, inexpensive and, most importantly patients-directed treatment for stroke may which improve hand function also. **OBJECTIVE:** To assess the effectiveness of mirror therapy in hand functioning. **METHOD:** This narrative review was intended to explore, describe, and interpret the hand functioning. The initial workout starts with the quantitative review literature. A literature review was searched from PubMed, EBSCO, DELNET etc., using key words such as Mirror therapy, stroke, functional improvement, upper hand. Articles from the year are 2010-2016 included in this narrative review. In that 14 review 8 review articles are removed and six full text articles are selected on the basis of inclusion criteria. **RESULT:** The review finding showed that mirror therapy in addition to a conventional rehabilitation program was more beneficial in terms of motor recovery and hand-related functioning. **CONCLUSION:** The present review showed a trend that mirror therapy is effective in the upper limb treatment of stroke patients. The six studies concluded that the mirror can be useful for acute, sub-acute stroke. The mirror therapy is an efficient, simple and cost-effective treatment in combination to the conventional stroke rehabilitation program leading to improvement in hand functions of patients with acute/sub-acute stroke.

KEYWORDS: mirror therapy, stroke, effectiveness, hand functioning.

INTRODUCTION:

Stroke is the sudden death of brain cells due to lack of oxygen, caused by blockage of blood flow or rupture of an artery to the brain. Sudden loss of speech, weakness or paralysis of one side of the body can be the produced symptoms. Stroke is one of the leading death and disability causes worldwide. The hand function comprises the sensory & motor aspects of normal hand function from both neurophysiology & behavioral perspectives. Hand function is crucial to manual exploration and manipulation of the environment. There is a need to incorporate simple, easy, economic, patient directed and effective treatment techniques to enhance recovery following stroke. Mirror therapy was first introduced by Ramachandran and Roger to treat phantom limb pain after amputation. For stroke there is a moderate quality of evidence that mirror therapy as an additional intervention improves recovery of arm function. Mirror Therapy is a newer technique which is thought to affect neuroplasticity and is simple and convenient to apply. The mirror provides patients with visual input. The mirror reflection of the moving good arm looks like the affected arm moving correctly and perhaps substitutes for the often decreased or absent proprioceptive input. Mirror therapy is a relatively new therapeutic intervention which is simple, inexpensive and most importantly, patient directed treatment that focuses on moving the unimpaired limb. The aim of the study is to evaluate the effectiveness of mirror therapy on hand function improvement in acute and sub-acute stroke patient. The research has focused on the mechanisms that underlie the effects of mirror therapy.

2. METHODOLOGY

2.1 Search strategy method:

- A literature review was completed in which search done from PubMed, EBSCO, DELNET etc., using key words such as Mirror therapy, stroke, effectiveness, hand functioning. The reviews focused on the period 2010-2016 because most of the studies were done in between these years. More than 14 review of literature is available. 6 articles are included in this review because of their eligibility. The method was used pre- test to post test experimental study design study.
- The studies included were conducted in countries, such as India and Italy.
- 14 articles have been selected 5 Articles excluded because full text articles was not present and 3 Articles excluded because inclusion criteria is not met.
- All reviews show that purposive sampling and convenience sampling technique used.

2.1.1 Types of studies:

Quantitative studies with: Quasi experimental design and purposive sampling and convenience sampling technique are included.

2.1.2 Type of participants:

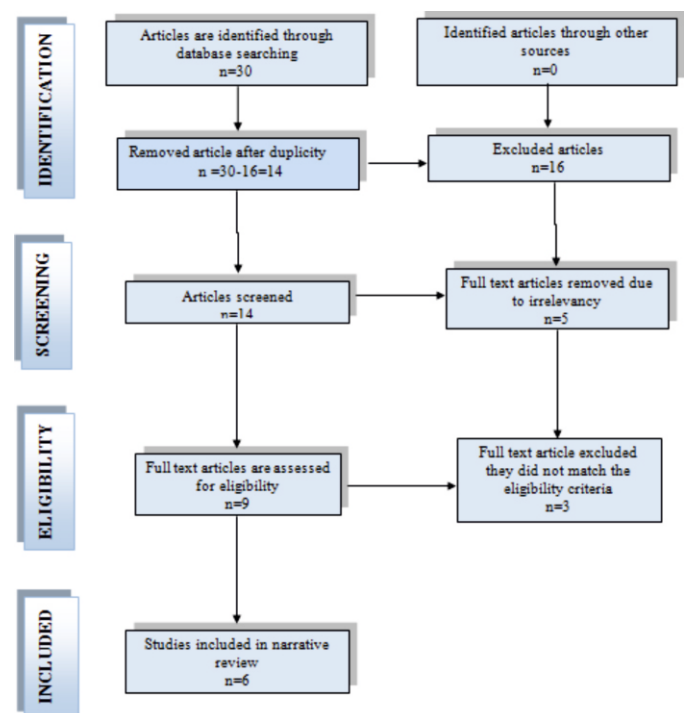
Stroke patient.

2.1.3 Settings:

K.T.G. Hospital, Bangalore India, Pravara Institute of Medical Sciences, District: Ahmednagar, Maharashtra State, India Department of physical medicine and rehabilitation of Dr Ram Manohar Lohia Hospital, New delhi India Physical and Rehabilitation Medicine, Department of Health Sciences, Novara Italy, Department of Physiotherapy, Ahmednagar Maharashtra India Department of Physiotherapy, Ahmednagar Maharashtra India.

3. RESULTS

3.1 PRISMA CHART



3.2 Table no. 1: Data extraction table-

SR. No	Problem statement/ Author	Place of research & year	Variables	Tool	Time duration	Outcomes	Conclusion
1)	Effectiveness Of Mirror Therapy as a home program in Rehabilitation of hand Function in sub-acute stroke. <i>FemyMol Baby Vinod Babu. K Sai Kumar. N Akshata Akalwadi</i>	K.T.G. Hospital, Bangalore India 2014	Dependent variable-Hand function Independent variables-Mirror therapy	Chedoke Arm and Hand activities Inventory-9 (CAHAI-9)	4 weeks	CAHAI-9 was used to measure the functional hand recovery before and after 4 weeks of intervention in the experimental groups. -There was a significant difference ($P>0.05$) in the post intervention CAHAI-9 scores between the groups	This study helped us to choose the CAHAI-9 as a scale to measure the hand functions effectively in patients with stroke.
2)	Comparison of Task Specific Exercises and Mirror Therapy to Improve Upper Limb Function in Sub acute Stroke Patients. <i>Sneha S. Khandare R. M. Singaravelan</i>	Pravara Institute of Medical Sciences, District: Ahmednagar, Maharashtra State, India 2013	Dependent variables: Grasp, Grip, Pinch, Gross movement and Voluntary control Grading Independent variables: Task specific exercises and Mirror therapy	Action Research Arm Test, Fugl-Meyer Assessment and Voluntary Control Grading	Task Specific Exercises for 30 minutes per day for 5 days in a week for 4 weeks (total = 20 sessions).	The 3 groups are taken researcher Group-A, Group-B, Group-C. Group A received Task specific exercise (TSE), Group B received Mirror therapy (MT) and Group C received Task specific exercise (TSE) as well as mirror therapy (MT). The researcher identify Group C showed significant improvement outcome than Group A & Group B.	This study gave us an insight into the effectiveness of mirror therapy given in combination to the task specific exercise (TSE) in improving the hand function in stroke patients.
3)	Efficacy of mirror therapy in sub-acute stroke: A case-control study <i>Deo Rishi Tripathi, Mahesh Kumar Talele, Surya Bhan Singh, Shipra Chaudhary And Amod Kumar</i>	Department of physical medicine and rehabilitation of Dr Ram Manohar Lohia Hospital, New delhi India 2016	Dependent variable-Motor recovery, Spasticity, Functional independence measure and hand related functional. Independent variables-Mirror therapy	Brunnstorm and Action Research Arm test and Functional Independence Measure.	short-term (at 4wk) and long-term (at 6month)	The beneficial effect of mirror therapy on hand functioning was recorded in parameters of Brunnstorm, Action Research Arm test and Functional Independence Measures at 4 weeks showed significant improvement.	Mirror therapy in addition to a conventional rehabilitation program was more beneficial in terms of motor recovery and hand-related functioning .
4)	The value of adding mirror therapy for upper limb motor recovery of sub-acute stroke patients <i>M.Invernizzi, S. Negrini, S. Carda, L. Lanzotti, C. Cisari</i>	Physical and Rehabilitation Medicine, Department of Health Sciences, Novara Italy 2012	Dependent variable-Upper limb motor Recovery Independent variables-Mirror therapy	Motricity Index (MI) and the Functional Independence measure (FIM)	4 weeks	The group receiving mirror therapy had greater improvements in the Action research arm test (ARAT), Motricity Index (MI) and Functional independence measure (FIM) values compared to conventional therapy (CT) group.	The study concluded Mirror Therapy is a promising and easy method to improve motor recovery of the upper limb in sub acute stroke patients.
5)	Evaluation of Mirror Therapy for Upper Limb Rehabilitation in Stroke. <i>Muzaffar Tufail, Wadhwa RK, Borah Diganta, Laisram Nonica</i>	Department of Physical Medicine and Rehabilitation, Delhi India 2013	Independent variables-Mirror therapy Dependent variables-Upper limb Rehabilitation	(Brunnstrom stages), spasticity (modified Ashworth Scale)	0 month (pretreatment), 1 month (post-treatment), and 6 months (follow-up).	Patients were assessed in terms of motor recovery (Brunnstrom stages), spasticity (modified Ashworth Scale), and the self-care items of the Barthel index. These indices were measured at 0 month (pretreatment), 1 month (post-treatment), and 6 months (follow-up).	The study conclude that Mirror therapy can be a useful intervention supplement in rehabilitation of patients; it provides a simple and cost effective therapy for recovery of hand function.
6)	Effectiveness of Mirror Therapy to Improve Hand Functions in Acute and Sub-acute Stroke Patients. <i>Snehal Narsinha Waghavkar and Suvarna Shyam Ganvir</i>	Department of Physiotherapy, Ahmednagar Maharashtra India 2015	Dependent variable-Hand Functions Independent variables-Mirror therapy	Fugl Meyer Assessment (FMA-WH) and Wolf Motor Function Test (WFMT-WH).	20 min per session, 4 days per week for 4 weeks.	This study says that Participants showed significant improvement for Fugl meyer assessment (FMA) and wolf motor function test (WFMT) at post assessment. WFMT-WT Changed from 7.545 to 15.727 ($P<0.0001$) and FMA-WH changed from 34.18 to 47.36 ($P=0.0002$)	The study concluded that mirror therapy can be useful intervention in rehabilitation of patient with stroke, when given as adjunct therapy for 4 days per week for 4 weeks.

RESULTS

Studies focused in tools used for the measurement of hand functions in a study outcome measure were taken in terms of motor recovery (Brunnstrom stages), spasticity (Modified Ashworth scale) and self-care items of the FIM (Functional independence measure) instrument and Action Research Arm Test (ARAT)

(Deo,R.T.,et.al 2016).

This study shows that mirror therapy (MT) combined with a conventional therapy (CT) is a safe, easy and effective treatment to improve motor recovery of the upper limb in subacute post-stroke patients.

(Invernizzi,M.,et.al 2012).

Patients were assessed in terms of motor recovery (Brunnstrom stages), spasticity (modified Ashworth Scale), and the self-care items of the Barthel index. These indices were measured at 0 month (pretreatment), 1 month (post-treatment), and 6 months (follow-up). It seems likely that this illusion enhances activation of the premotor and motor cortex in a similar way to action observation or motor imagery. This effect can be explained by the activation of so-called mirror-neuron system. Mirror neurons are neurons that fire when the subject performs a movement, but also during observation of the same movement by someone else, and they seem to play a central role in the process of motor (re-)learning by action observation

(Tufail,M.,et.al 2013).

The 4 weeks of home based Mirror therapy combined with conventional exercises as a home program in rehabilitation of hand function found significantly effective improvement of functional hand recovery in sub-acute stage of stroke.

(Femy, M.B., et.al 2014).

Mirror therapy can be added along with task specific exercises in the treatment of sub-acute stroke patients to improve upper limb function.

(Sneha, S.K.,et.al 2013).

Mirror therapy (MT) is an alternative therapeutic intervention that uses the interaction of visuomotor-proprioception inputs to enhance movement performance of the impaired hand of stroke patient. It has been suggested that mirror therapy is a simple, inexpensive and, most importantly patient-directed treatment that may improve hand function also.

(Snehal.N.W.,et.al 2015).

4. DISCUSSION

This review helped in identification of the fact that stroke is a leading cause of disability, where patients need full support for activities of daily living.

The functional impairment of the upper limb is a usual consequence of stroke that affects about 85% of the survivors.

(Invernizzi, M- 2012).

This review focuses on the efficacy of mirror therapy in the improvement of hand function in patients after stroke.

Mirror therapy in stroke patients resulted in significant recovery of grip strength, hand movement of paretic arm, steady & accuracy of arm movements

(Femy. M.B-2014)

This review has emphasized on the use of mirror therapy in combination with the conventional rehabilitation method for post- stroke patients for an effective improvement in hand function.

30 min. of mirror therapy in addition to conventional rehabilitation program was more beneficial in terms of motor recovery of upper limb than conventional rehabilitation plus 30 min of sham therapy in acute post- stroke patient

(Invernizzi, M-2012).

This review has focused in the emergence of the trend that mirror therapy is beneficial in the improvement of hand functions in acute and sub-acute stroke patients.

At 6 month post stroke, 25%-53% of people remain dependent in at least one Activity Daily living (ADL) task, which often involves the use of unilateral or bilateral upper limb movement.

(Sneha,s 2013)

This review studied the advantage of mirror therapy being a simple, inexpensive and patient directed treatment that may improve hand function.

Majority of stroke survivors continue to live with disabilities and the cost of ongoing rehabilitation and long term care are largely undertaken by family members,

which impoverish their families.

(Deo. R.T.-2016).

5. CONCLUSION

On the basis of all six studies which were included in this narrative review it can be concluded that:

- Mirror therapy can be an effective and useful intervention supplement in rehabilitation of patients with sub-acute stroke.
- It is a simple and cost effective therapy for hand motor recovery in acute and sub-acute stroke patients.
- Mirror therapy combined with a conventional therapy is a safe, easy and cost effective treatment to improve motor recovery.

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